

that some form of magic underlies the ceremony. Among the Ewe negroes of Togoland, when any of the tribe desire to prevent a slave from running away, it is customary to bring him before a fetish named Nanyo, where the priest pares the nails of the slave's fingers and toes, shears some of the hair of his head, and buries all the parings and cuttings in the earth with a fetish mark. Other ceremonies are included, but those quoted are ample to show (from the common beliefs about magical powers obtained through possession of the nail-parings and hair of an enemy) that the master has now some occult control over his servant. In the case of the Hebrew slave it is the blood which represents the substance through which the control is acquired; and when the earlier form of the Hebrew law, as recorded in Exodus, is remembered ("then his master shall bring him unto God, and shall bring him to the door, or unto the door-post"), the connection with the savage story is still more striking.

The curious story of Elijah and the ravens is briefly discussed literally. It is curious to see that Sir James Frazer (who read the whole of the Old Testament in Hebrew before undertaking this great work) is apparently unaware of the ingenious but simple emendation of the word "ravens" (*orëbhîm*) to "Arabs" by a very slight vowel change, which, of course, renders any mythical explanation unnecessary.

There are one or two small slips noticeable. In the description of Babylon the learned author describes the mound Babil, which is the most northern of the three mounds composing the city, as the site of the ancient temple *E-temen-an-ki* (the real Tower of Babel), which actually lies a little to the north of the southern mound Amran, at least a mile from Babil. Another small slip is "Mandace" (three times, vol. ii., p. 441) for "Mandane," the mother of Cyrus. But the wonder is that, in all this varied display of erudition, the slips should be so small and trivial. It is impossible to do justice to the large number of new theories amply supported by evidence. Hebraists and anthropologists (and, incidentally, examiners for the Oriental Tripos) have at hand a wonderful storehouse, an Aladdin's cave of jewels, on which to ponder. R. C. T.

THE PAST AND FUTURE OF ORGANIC CHEMISTRY.

Recent Advances in Organic Chemistry. By Dr. A. W. Stewart. With an introduction by Prof. J. N. Collie. Third edition. Pp. xx+350. (London: Longmans, Green, and Co., 1918.) Price 14s. net.

THE growing mass of research in pure and applied chemistry has created a demand for some kind of periodical summary which will afford the non-specialist an opportunity of following the varied phases of development of the science without wading through the original literature. This demand is being met by the annual reports of the Chemical Society and the Society of

Chemical Industry, and to a more limited extent by *Science Progress*, by the "Smithsonian Reports," and by the Journal of the Royal Society of Arts. The volume under review stands in a somewhat different category, for it takes in its successive chapters the character of a general *résumé*, a students' text-book, a critical essay, and a speculative forecast. Such varied treatment has many advantages for both author and reader. For the latter, severe mental application is not demanded, and the matter is sufficiently varied to be stimulating without being wearisome; for the former, free play is permitted to his and other people's imagination without the controlling fetters of unbiassed fact.

The latest edition of Dr. Stewart's well-known book has attempted to sustain its character as a record of new achievements in organic chemistry by deleting some former chapters and replacing them by others of fresher interest. Thus the polymethylene group, the quinols, asymmetric synthesis, and the bibliography have been replaced by accounts of recent researches on chlorophyll, the anthocyanins, the chemistry of rubber, and new arsenic compounds, whilst the chapters on triphenylmethyl and the alkaloids have been somewhat extended.

A book which professes to record recent advances is bound to modify its contents with each succeeding edition as the subjects pass into the range of ascertained facts, and so fall into their natural positions in the scheme of classification. It is a little difficult, therefore, to perceive upon what principle the present selection is made—why certain chapters should be discarded, whilst others which appeared in the earliest edition should be retained almost intact. The opening chapter, on "Organic Chemistry in the Twentieth Century," is extremely lucid and well expressed, but much too superficial to be instructive. Here is a paragraph:—"As far as the benzene nucleus is concerned, the question which has excited most interest recently is the substitution problem; but it cannot be said that, even yet, in spite of extensive investigation, we possess the true key to the riddle," and there the matter ends, and those who do not know what the substitution problem is are referred to a solid treatise of 500 pages by Holleman. Nevertheless, to those familiar with the changes that have taken place during the century, the chapter as a whole will serve as a pleasant reminder.

It may be observed that the theory of isorrepesis is still retained, in spite of the contrary evidence adduced by Lowry, to which no mention is made. The word "ketene," which is derived from ketone, with the usual suffix "ene," denoting doubly linked carbon, is written, *à la* German, "keten," an undesirable modification from every point of view.

The succeeding chapters on the terpenes, the alkaloids, and the polypeptides have undergone little or no change, and are ordinary text-book descriptions; but those on chlorophyll and the anthocyanins are new, and introduce us

to some of the most highly complex structures found in organic Nature, the constitution of which has been elucidated in a masterly fashion by Willstätter and his associates.

One of the most interesting chapters in the book is that dealing with theories relating to the synthesis of vital products, the greater part of which, according to the author, has been elaborated by Prof. Collie. Here we enter the realm of speculation; indeed, so little is known of the laboratory methods of the living cell that free rein may be given to the chemical imagination. Enzyme action, of which, however, little of value is said, will probably furnish the key to organic synthesis and cleavage within the living organism, and, until that action has been more fully explained, there is no harm in manufacturing equations and mechanical devices to represent these changes.

One point, however, must be borne in mind—namely, that these changes must take place with comparatively small energy changes, so that the equilibrium may be easily induced to shift, and the balance of a reversible reaction thrown, to one or other side of the normal point; in short, vital reactions, if the expression may be used, must occur within a small range of temperature. In this respect such reactions as the synthesis of pyridine derivatives from malic and citric acids, which were studied many years ago by v. Pechmann and others, and the more recent work on the synthesis of tropinone by Robinson, have an unequivocal significance.

J. B. C.

OUR BOOKSHELF.

The Science and Practice of Manuring. For the Use of Amateur, Market, and Professional Growers, Orchardists, etc. By W. Dyke. With introduction by J. Wright. Revised and enlarged edition. Pp. 157. (London: The Lockwood Press (Harvey H. Mason), n.d.) Price 2s. net.

MR. DYKE is well known to horticulturists as a man with a strong scientific bent, and by those men of science who are interested in large-scale crop production he is recognised as possessing a considerable stock of problems still requiring solution. The scientific worker will, therefore, take up this book in the hope of finding a record of some of these observations. He will not be altogether disappointed, yet he will not find so much as he might hope; for Mr. Dyke, having written for the practical man and not for the plant physiologist, sets out some of the elementary scientific facts which he considers the grower needs, but he has not always recorded the growers' observations, which the scientific reader would like to have had, and which no doubt Mr. Dyke considered the practical grower did not need to be told.

Mr. Dyke knows his *clientèle* so well that he may safely be trusted to furnish a syllabus of the things they wish to know. To the horticultural lecturer this will be one of the most interesting features of the book.

The information given to the growers is largely sound and likely to be helpful. Some of the data might well be modernised, and a certain number of the figures need correction. In particular some of the statistics in the first chapter are inaccurate; some of the experimental data given in later chapters are old, and more modern figures are available. It is incorrect also to say, on p. 20, that agricultural chemists have "entirely overlooked" the possibility of the presence of ammonium nitrate in the soil. Large numbers of determinations have been made, but in no case is more than a trace of ammonia present either in cropped or uncropped soils. The amount of nitrate, however, may rise considerably. It is very doubtful whether the recommendation of ground leather is sound, and it is certain that a well-made superphosphate does not become wet and sticky, or lose soluble phosphate on keeping, at any rate so long as it is kept in a weather-proof shed.

The Life and Discoveries of Michael Faraday. By Dr. J. A. Crowther. ("Pioneers of Progress," Men of Science Series.) Pp. 72+portrait. (London: Society for Promoting Christian Knowledge, 1918.) Price 2s. net.

IN these days, when, by the loom of science, strange and terrible patterns have been woven on our national life, and novel and improved designs are demanded on every side, it is refreshing to turn again to the history of one of the greatest pioneers in scientific discovery and renew our spiritual friendship with that "Just and Faithful Knight of God," Michael Faraday. The author of this little volume has done his work well, and given us a realistic picture both of the scientific enthusiast and of the humble and devout Christian. "Not half his greatness was incorporate in his science, for science could not reveal the bravery and delicacy of his heart." We could wish this book to be read by our legislators, by our manufacturers, and even by our educational authorities, in order to impress upon them "that research must be free to be powerful and that there is little to be gained from a servile science." Gradually but surely the ideas of Faraday have permeated physical science, and at no time since their publication have they met with such general acceptance as they do to-day. "It may fairly be claimed that modern English physics is the school of Faraday, applying his methods, led by his vision, inspired by his faith."

H. S. A.

Cotton. By George Bigwood. ("Staple Trades and Industries," vol. ii.) Pp. viii+204. (London: Constable and Co., Ltd., 1918.) Price 6s. 6d. net.

THIS volume gives a readable, popular account of the whole field which the cotton industry includes, beginning with the historical records, and passing successively through the cotton fields, the mills, and the markets. The book is well printed and illustrated, but, especially on the technical side, it would be improved by a number of corrections when it reaches the second edition.

L. B.